

Prevalence of Common Ocular Disorders among Secondary School Students in Yola North, Adamawa State, Nigeria

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ABSTRACT

Introduction: Early eye screening is recommended for detecting ocular disorders in children. Schools offer a strategic platform for such public health interventions. Up to about 26% of school-aged children experience visual impairment, emphasizing the need for the timely identification and treatment of eye disorders among this population.

Aim: This study assessed the prevalence and pattern of common ocular disorders among secondary school students in Yola North Local Government Area, Adamawa State, Nigeria.

Methods: A school-based cross-sectional study was conducted from January to February 2024, utilizing a multistage sampling technique. Students from both public and private schools were recruited. Eye examinations included visual acuity assessment, external ocular examination using a pen torch, and fundal examination using a direct ophthalmoscope. Data were analyzed using IBM SPSS version 26.

Results: Out of 460 students screened 94% were under 18 years (mean age of 14.2 ± 2.3 years) and 50.4% were female. The most prevalent ocular conditions were allergic conjunctivitis 176(38.3%), bacterial conjunctivitis 59(12.8%), and refractive error 18(3.9%). Fundus abnormalities included suspicious discs 23(5%), glaucomatous changes- 3(0.7%). Referral uptake was 57.4%.

Conclusion: A significant burden of preventable ocular disorders exists among

secondary school students in Yola North, with allergic conjunctivitis being the most prevalent condition and referral uptake for specialist care is suboptimal.

INTRODUCTION

High-quality vision is essential for children to attain their full academic capability in the classroom environments, as most of what is presented for learning needs to be visualized.^{1,2} Young children with early onset of vision impairment can face poorer levels of academic work attainment and delayed motor, verbal, emotional, social, and cognitive development, with long-term effects.³ Visual problems have serious negative consequences on academic achievements, among schoolchildren when they are not recognized early.¹ This has a lasting impact on the individual child, his/her immediate family, and the wider society as educational and economic opportunities may be adversely affected.²

Vision screening is the search for unrecognized eye disease or defects by means of a rapid-applied test, examination, or other procedure in apparently healthy individuals. A screening test is not intended to be a diagnostic test; it is only an initial examination.⁴ Vision screening in children is important for the early detection of visual impairment, its causes, and the institution of timely interventions.^{5,6} Vision screening as part of primary eye care is the primary health care approach to the prevention of blindness.⁷ To ensure the eye health of children, appropriate measures must be instituted from early childhood and sustained throughout

adolescence and adulthood to detect developmental defects.

According to the World Health Organization (WHO), approximately 2.2 billion individuals worldwide are affected by near- or far-vision impairment, and in at least one billion of these cases, the impairment could have been avoided or corrected.⁸ One million, five hundred thousand children worldwide are blind, of which 1.0 million live in Asia, 0.3 million in Africa, 0.1 million in Latin America, and 0.1 million live in the rest of the world.^{9,10} The Nigeria National Blindness and Low vision survey reported the prevalence of blindness among children aged 10-15 years to be 0.6%.¹¹

Under the Vision 2020 programme, the World Health Organization reported posterior segment lesions as the leading cause of childhood visual impairment in developed countries. Whereas, refractive errors and vitamin A deficiency were the most prevalent treatable and preventable causes of childhood blindness and visual disturbances in developing countries.^{12,13}

Balarabe *et al.*¹⁴ conducted a study among secondary school students aged 11–20 years in Kebbi State, Nigeria, identifying uncorrected refractive error as the most prevalent visual issue, accounting for approximately 33.3% of cases. Among these, myopia was the most common type (60%), followed by hypermetropia (23.3%), astigmatism (16.7%), and amblyopia (0.16%).¹⁴ Maduka-Okafor *et al.*¹⁵ in a school-based cross-sectional study conducted in 5 south-eastern states of Nigeria, reported that refractive error (hyperopia 0.1% and myopia 2.0%, respectively) was the leading cause of visual impairment and amblyopia, satisfying the predefined criteria, was the second main cause of visual impairment in 30 eyes (5.8%). The cause of visual impairment was undetermined in 19 eyes.¹⁵ Ayanniyi *et al.*¹⁵, in a cross-sectional survey of primary school children in Ilorin, Nigeria, found that the most common ocular disorders among the pupils were refractive errors and vernal conjunctivitis with a prevalence of 6.9% and 6.7% respectively. Other causes included genetic/congenital/developmental ocular disorders 2.8%,

glaucoma /glaucoma suspect 1.4%, ocular infections 1.3%, and ocular trauma 0.8%. Majority of the causes of visual impairment and blindness among the children were avoidable.¹⁶ Similarly, in another study conducted by Adejumo *et al.*¹⁷, in Southwest Nigeria among preschool children, the common ocular disorders among participants were refractive error 3.9%, allergic conjunctivitis 1.3%, strabismus 0.9%, congenital cataract 0.4%, congenital ptosis 0.4%, optic atrophy 0.4%, ectopia lentis 0.2%, and phthisis bulbi 0.2%. However, there was no statistically significant difference in the distribution of ocular disorders by age or gender.¹⁷ In another cross-sectional study conducted among school children in Ifo LGA of Ogun State the common ocular morbidities reported were refractive error 39.7%, glaucomatous optic neuropathy 33.5%, allergic conjunctivitis 19.2%, corneal opacity 2.7% and lenticular opacity 2.2%. Also, ocular morbidities reported among children with severe visual impairment included refractive error 71.4%, allergic conjunctivitis and corneal opacity 14.3%.¹⁸

Vision plays a crucial role in a child's learning and development.^{1,2} Unrecognized visual impairment can negatively affect academic performance, social integration, and overall quality of life.¹ School-based eye screenings offer a practical approach to early detection and intervention, especially in low-resource settings.^{18,19} This study assessed the prevalence, types of ocular disorders and referral attendance rate among secondary school students in Yola North, Adamawa State, Nigeria.

METHODS

This school-based descriptive cross-sectional study was conducted between January and February 2024. Ethical clearance for the study was obtained from the Human Research Ethics Committee (HREC) at the National Eye Centre, Kaduna, and permission was granted by the Adamawa State Ministry of Education and Human Capital Development. Assent and parental informed consent were obtained from adolescents aged 10 to 17 years, and informed consent was obtained from those aged 18 to

21 years before recruitment into the study. Using a multistage sampling technique, four hundred and ninety-six (496) students from ten (10) schools (public and private) were selected. Sociodemographic information was obtained using a questionnaire. All students underwent comprehensive eye examinations, which included visual acuity (VA) assessment (using Snellen's chart) in a hallway with access to daylight illumination, external ocular examination with a pen torch, and fundal examination with a direct ophthalmoscope in a dimly lit classroom. Students with VA $\leq$ 6/12 who improved with pinhole (PH) were refracted using the auto-refractor and referred to Modibbo Adama University Teaching Hospital (MAUTH), Yola, for spectacles. Students with VA $<$ 6/12 who did not improve with PH or refraction and students with identified ocular pathologies such as allergic conjunctivitis (hyperpigmentation of the periocular skin and brownish discoloration of the eyes), infective conjunctivitis (redness of the eyes and or copious whitish discharge from the eye), cataract/leukocoria (white pupil), corneal opacity, strabismus, suspicious disc (defined by cup disc ratio of $>$ 0.5 and asymmetry of 0.2 or more) were referred to MAUTH for further evaluation and management.

Adherence of the students and their parents/guardians to referral was encouraged via written, text, and phone call reminders, and subsequently confirmed with a referral feedback slip from MAUTH. Referral attendance was assessed three weeks after referral.

IBM SPSS Software (version 26), Armonk, NY, USA, was used to analyze the data obtained, and the data were presented in percentages and means.

RESULTS

Out of the 496 students recruited, 460 (92.7%) were examined. The ages of these students ranged from 10 to 21 years, with 94.1% being under 18 years old and an average age of 14.2 ± 2.3 years. Students from all classes were examined, with Junior Secondary School One and Senior Secondary School One students accounting for a greater proportion of the

students (45.2%). Among the students, 57.4% were from privately owned schools. One hundred and forty-eight (32.2%) students had a family history of ocular disorders (Table 1).

The overall prevalence of ocular disorders was 63.9%, as 294 students presented with one or more ocular abnormalities, while 166 (36.1%) had normal ocular findings. The most common ocular disorder identified was allergic conjunctivitis (38.3%), followed by bacterial conjunctivitis (12.8%). Refractive errors were found in 3.9%; myopia (2.2%), hypermetropia (1.5%), and astigmatism (0.2%). Other ocular findings included suspicious disc changes (5.0%), glaucomatous disc (0.7%), corneal opacity (0.7%), cataract (0.4%), and unilateral macular pathology/ optic atrophy (0.4%), as shown in Table 2

A total of 47 (10.2%) students with presenting visual acuity $<$ 6/12 that did not improve with pinhole/refraction or with ocular pathology were referred to the tertiary eye care center for further evaluation and treatment. Of the 47 students referred, 27 (57.4%) attended the referral center and received specialist evaluation, while 20 (42.6%) did not honor their referral appointments.

DISCUSSION

The overall prevalence of ocular disorders in this study, 63.9% is considerably higher than findings from other school-based studies conducted in Nigeria. Abah *et al.*²⁰ in Zaria reported a prevalence of 22.6% among school-aged children, while Ayanniyi *et al.*¹⁶ in Ilorin documented 19.9%. This difference may be attributed to the high occurrence of allergic and bacterial conjunctivitis, which together accounted for over half of all detected abnormalities, and may be partly explained by variations in operational definitions of ocular disorders, sample size and sampling methods. The prevalence of allergic conjunctivitis in this study is comparable to the 48.7% found in the study in Ile Ife, Osun state, by Adegbekingbe *et al.*²¹, but higher than 7.4% and 7.3% reported by Ajaiyeoba *et al.*²² and Abah *et al.*²⁰, respectively. The warm, dry, and dusty weather in Adamawa state, Northern Nigeria, in addition

Table 1: Socio-demographic characteristics of the students

Socio-demographic variables	Frequency (n = 460)	Percentage %
Age group (years)		
<18	433	94.1
≥18	27	5.9
Mean age ± SD	14.2 ± 2.3 years	
School type		
Private	264	57.4
Public	196	42.6
Sex		
Male	228	49.6
Female	232	50.4
Class		
JSS1	110	23.9
JSS2	72	15.7
JSS3	49	10.7
SS1	98	21.3
SS2	77	16.7
SS3	54	11.7
Father's educational qualification		
No formal education	6	1.3
Primary	1	0.2
Secondary	92	20.0
Tertiary	361	78.5
Mother's educational qualification		
No formal education	15	3.3
Primary	9	2.0
Secondary	151	32.8
Tertiary	285	61.9
Family history of eye disorder		
No	230	50.0
Yes	148	32.2
Don't know	82	17.8

JSS =junior secondary school, SSS =senior secondary school

Table 2: Prevalence of eye disorders among the students

Eye Disorder	Frequency (n)	Percentage (%)
Allergic conjunctivitis	176	38.3
Bacterial conjunctivitis	59	12.8
Refractive errors (total)	18	3.9
• Myopia	10	2.2
• Hypermetropia	7	1.5
• Astigmatism	1	0.2
Suspicious disc	23	5.0
Glaucomatous disc	3	0.7
Corneal opacity	3	0.7
Cataract	2	0.4
Unilateral macular pathology	2	0.4
Total with ocular disorders	294	63.9
Normal ocular findings	166	36.1

to differences in operational definitions of allergic conjunctivitis, study design and population may have accounted for these differences.

The prevalence of refractive error observed in this study is lower than most regional reports^{16,23,24} but comparable to Kebbi (4.8%).¹⁴ This may be likely due to differences in diagnostic criteria and students' reading habits.

The prevalence of suspicious optic discs is notably higher than in other Nigerian studies, which reported rates between 0.8% and 3.7%. This could reflect geographic variation or differences in examiner interpretation and sample size.^{20,25,26} Other, less frequent conditions like corneal opacities and optic atrophy point to underlying early childhood eye health conditions and poor eye care access.

Referral attendance was suboptimal, with only 57.4% of referred students presenting for further care. Possible reasons for this low referral attendance rate may include parental absence, financial constraints, and academic schedules. Comparable rates have been documented internationally, with improvements seen following structured follow-up interventions.^{27,28}

CONCLUSION

Ocular morbidity is prevalent among secondary school children in Yola North, with allergic

conjunctivitis being the most common. Referral uptake was suboptimal. Further research into referral systems for school base-screening programmes is recommended.

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